AI Planning
Exercise Sheet 12

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Exercise 12.1

$D_0^{bwd} := \{\gamma\}$ //per definition
$D_1^{bwd} := \{\gamma, o_1\}$ //a is precondition, b is an effect in any case
$D_2^{bwd} := \{\gamma, o_1, o_2\}$ // a is an effect in any case
$D_3^{bwd} := \{\gamma, o_1, o_2, o_3\}$ //$\neg a \wedge b$ is an effect in any case
$\delta_G^{bwd}(I') = 3$

Exercise 12.2

Definitions:
$img_o(s) = \{s' \in S \mid s \xrightarrow{o} s'\}$
$wpreimg_o(s') = \{s \in S \mid s \xrightarrow{o} s'\}$
$spreimg_o(T) = \{s \in S \mid \exists s' \in T : s \xrightarrow{o} s' \wedge img_o(s) \subseteq T\}$
Since the given transition system maps every state to *exactly one* other state (more formally: $\forall s \in S : |img_{o_s}(s)| = 1$) we can transform the definition of a strong preimage of a *set of states* to one of a *single state*.

Exercise 12.3